In the Claims:

- 1. (Currently Amended) A method for converting natural gas to an olefin., olefin, comprising:
 - a) providing a stream of natural gas;
 - b) separating the natural gas stream into a feed stream and a burn stream;
- c) conveying the feed stream and burn stream to a furnace wherein the burn stream is burned and wherein the feed stream is heated to form hydrogen and reactive products comprising an acetylene portion;
 - d) quenching the reactive products and hydrogen; and
- e) conveying the reactive products to a catalytic reactor and providing hydrogen and a catalyst in the reactor such that the reactive products are converted to the olefin.
- 2. (Original) The method of claim 1 wherein the pressure of the natural gas stream is between about 1 bar and about 20 bars.
- 3. (Original) The method of claim 1 wherein in step b) the feed stream is heated to a temperature in the range from about 1000 K to about 1800 K.
- 4. (Original) The method of claim 3 wherein the feed stream is maintained at a temperature of at least 1000 K for less than 100 milliseconds.
- 5. (Original) The method of claim 1 wherein the catalyst in the catalytic reactor is selected from the group of catalysts consisting of nickel-boride, metallic paladium, a bimetallic catalyst, and palladium with a group 1b metal.
- 6. (Original) The method of claim 1 wherein the temperature in the catalytic reactor is in the range from about 300 K to about 1000 K.

- 7. (Original) The method of claim 1 wherein the olefin is ethylene.
- 8. (Original) A method for converting natural gas to an olefin, comprising:
- a) providing a stream of natural gas;
- b) conveying the natural gas to a reactor and heating the natural gas using electrical power, wherein the natural gas is heated to form hydrogen and reactive products comprising an acetylene portion;
 - c) quenching the reactive products and hydrogen;
 - d) conveying the reactive products and hydrogen to a catalytic reactor; and
- e) providing hydrogen and a catalyst in the reactor such that the reactive products are converted to the olefin.
- 9. (Original) The method of claim 8 wherein in step b) the electrical power employs an electrical arc, resistance heating a plasma reactor, a fuel cell or a combined cycle gas turbine drive electrical generator.
- 10. (Original) The method of claim 8 wherein the pressure of the natural gas stream is between about 1 bar and about 20 bars.
- 11. (Original) The method of claim 8 wherein in step b) the feed stream is heated to a temperature in the range from about 1000 K to about 1800 K.
- 12. (Original) The method of claim 8 wherein the feed stream is maintained at a temperature of at least 1000 K for less than 100 milliseconds.
- 13. (Original) The method of claim 8 wherein the catalyst in the catalytic reactor is selected from the group of catalysts consisting of nickel-boride, metallic paladium, a bimetallic catalyst, and palladium with a group 1b metal.

- 14. (Original) The method of claim 1 wherein the temperature in the catalytic reactor is in the range from about 300 K to about 1000 K.
- 15. (Currently Amended) A method for converting natural gas to an olefin, olefin, comprising:
 - a) providing a stream of natural gas;
- b) conveying the natural gas through a furnace wherein hydrogen is burned and wherein the natural gas is heated to form hydrogen and reactive products comprising an acetylene portion;
 - c) quenching the reactive products and hydrogen; and
- d) conveying the reactive products to a catalytic reactor and providing hydrogen and a catalyst in the reactor such that the reactive products are converted to the olefin.
- 16. (Original) The method of claim 15 wherein the pressure of the natural gas stream is between about 1 bar and about 20 bars.
- 17. (Original) The method of claim 15 wherein in step b) the feed stream is heated to a temperature in the range from about 1000 K to about 1800 K.
- 18. (Original) The method of claim 15 wherein the feed stream is maintained at a temperature of at least 1000 K for less than 100 milliseconds.
- 19. (Original) The method of claim 15 wherein the catalyst in the catalytic reactor is selected from the group of catalysts consisting of nickel-boride, metallic paladium, a bimetallic catalyst, and palladium with a group 1b metal.
- 20. (Original) The method of claim 15 wherein the temperature in the catalytic reactor is in the range from about 300 K to about 1000 K.